



safe work australia

SAFE ACCESS IN TREE TRIMMING AND ARBORICULTURE

Draft
Code of Practice

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FOREWORD

This Code of Practice on safe access in tree trimming and arboriculture work is an approved code of practice under section 274 of the *Work Health and Safety Act* (the WHS Act).

An approved code of practice is a practical guide to achieving the standards of health, safety and welfare required under the WHS Act and the Work Health and Safety Regulations (the WHS Regulations).

A code of practice applies to anyone who has a duty of care in the circumstances described in the code. In most cases, following an approved code of practice would achieve compliance with the health and safety duties in the WHS Act, in relation to the subject matter of the code. Like regulations, codes of practice deal with particular issues and do not cover all hazards or risks which may arise. The health and safety duties require duty holders to consider all risks associated with work, not only those for which regulations and codes of practice exist.

Codes of practice are admissible in court proceedings under the WHS Act and Regulations. Courts may regard a code of practice as evidence of what is known about a hazard, risk or control and may rely on the code in determining what is reasonably practicable in the circumstances to which the code relates.

Compliance with the WHS Act and Regulations may be achieved by following another method, such as a technical or an industry standard, if it provides an equivalent or higher standard of work health and safety than the code.

An inspector may refer to an approved code of practice when issuing an improvement or prohibition notice.

This Code of Practice has been developed by Safe Work Australia as a model code of practice under the Council of Australian Governments' *Inter-Governmental Agreement for Regulatory and Operational Reform in Occupational Health and Safety* for adoption by the Commonwealth, state and territory governments.

A draft of this Code of Practice was released for public consultation on 26 September 2011 and was endorsed by the Workplace Relations Ministers Council on [to be completed].

SCOPE AND APPLICATION

This Code provides practical guidance for persons conducting a business or undertaking who carry out tree trimming and arboricultural work within the urban environment on methods that can be used to safely access trees when carrying out this work.

This Code is designed to provide guidance on the specific circumstances in the WHS Regulations that allow the use of certain methods to place persons in trees for tree trimming or tree lopping work.

This Code does not apply to forest operations. The Code of Practice on *Managing Risks in Forest Operations* [under development] should be referenced instead.

How to use this code of practice

In providing guidance, the word 'should' is used in this Code to indicate a recommended course of action, while 'may' is used to indicate an optional course of action.

This Code also includes various references to provisions of the WHS Act and Regulations which set out the legal requirements. These references are not exhaustive. The words 'must', 'requires' or 'mandatory' indicate that a legal requirement exists and must be complied with.

1. INTRODUCTION

Arboriculture is the art, science, technology and business of tree care and is carried out by arborists in an urban environment. Not only do arborists promote tree health, discern tree problems and take measures to correct them, they also maintain and protect trees in urban settings such as parks, reserves, schools and gardens.

1.1 Who has duties relating to tree trimming and arboriculture?

A **person conducting a business or undertaking** has the primary duty under the WHS Act to ensure, so as far as is as reasonably practicable, that workers and other persons are not exposed to health and safety risks arising from the business or undertaking.

The WHS Regulations include more specific requirements to manage the risks from falls, plant and other hazards that may be associated with tree trimming work such as noise and hazardous manual tasks.

Designers, manufacturers, suppliers, importers, installers and persons with management or control of plant that is likely to be used in tree trimming or arboricultural work must ensure, so far as is reasonably practicable, that the plant is without risks to health and safety.

Officers must exercise due diligence to ensure that the business or undertaking complies with the WHS Act and WHS Regulations. This includes taking reasonable steps to ensure that the business or undertaking has and uses appropriate resources and processes to eliminate hazards or minimise risks associated with tree trimming and arboricultural work.

Workers must take reasonable care for their own health and safety and must not adversely affect the health and safety of other persons. The worker must comply with any reasonable instruction and cooperate with any reasonable policy or procedure relating to health and safety at the workplace. If PPE is provided by the person conducting a business or undertaking, the worker must use it in accordance with the information, instruction and training provided on its use.

1.2 What is required to manage the risks?

In order to manage risk under the WHS Regulations, a duty holder must:

- a) identify reasonably foreseeable hazards that could give rise to the risk
- b) eliminate the risk so far as is reasonably practicable
- c) if it is not reasonably practicable to eliminate the risk – minimise the risk so far as is reasonably practicable by implementing control measures in accordance with the hierarchy of risk control, and
- d) review, and if necessary revise all risk control measures so as to maintain, so far as is reasonably practicable, a work environment that is without risks to health and safety.

This Code provides guidance on how to manage the risks associated with tree trimming and arboricultural work by following a systematic process that involves:

- identifying hazards
- if necessary, assessing the risks associated with these hazards,
- implementing and maintaining risk control measures, and
- reviewing risk control measures.

Guidance on the risk management process generally is available in the *Code of Practice: How to Manage Work Health and Safety Risks*.

Consulting workers

The WHS Act requires that the person conducting a business or undertaking to consult, so far as is reasonably practicable, with workers who carry out work and who are (or are likely to be) directly affected by a work health and safety matter.

If the workers are represented by a health and safety representative, the consultation must involve that representative.

Consultation is not only a legal requirement, but is a critical part of managing work health and safety risks. It involves sharing of information, giving workers a reasonable opportunity to express views and taking those views into account before making decisions on health and safety matters.

You must consult workers and their health and safety representatives, including contractors and subcontractors, throughout the risk management process. By drawing on their experience, knowledge and ideas, hazards are more likely to be identified and effective risk controls developed.

Consultation, co-operation and co-ordination of activities with other duty holders

The WHS Act requires that the person conducting a business or undertaking consult, co-operate and co-ordinate activities with all other persons who have a work health or safety duty in relation to the same matter, so far as is reasonably practicable.

Sometimes you may have responsibility for health and safety together with other business operators who are involved in the same activities or who share the same workplace. In these situations, you should exchange information to find out who is doing what and work together in a co-operative and co-ordinated way so that all risks are eliminated or minimised as far as reasonably practicable. For example:

- If you are a business owner who is carrying out tree trimming work with the use of a contracted mobile crane, you will need to co-operate and co-ordinate work activities with the person responsible for the mobile crane
- If your work is conducted within the workplace of another business you need to talk to that business about the risks your work could cause them and any precautions you are taking
- If you are a contractor engaged to undertake tree trimming work, you must consult, co-ordinate and co-operate with the electrical supply authority responsible for the overhead line

Further guidance on consultation is available in the *Code of Practice: Work Health and Safety Consultation, Co-operation and Co-ordination*.

2. MANAGING THE RISKS

Identifying hazards involves finding all of the things and situations that could potentially cause harm to people. Typical hazards found in tree trimming or arboricultural work include:

- Hazardous trees
- Being struck by falling objects
- Falls from height
- Slips, trips and falls
- Poor operator technique when using equipment
- Being struck by ejected timber/metal fragments from process plant

2.1 Hazard identification

Tree integrity

The integrity of the tree is critical to the safety of those working on or around it. Every tree must be inspected to identify the different characteristics of the tree along with any special considerations based on species (allergens, thorns, etc.).

Figure 1 below shows many of the conditions which could result in serious risk if they are not identified prior to starting work.

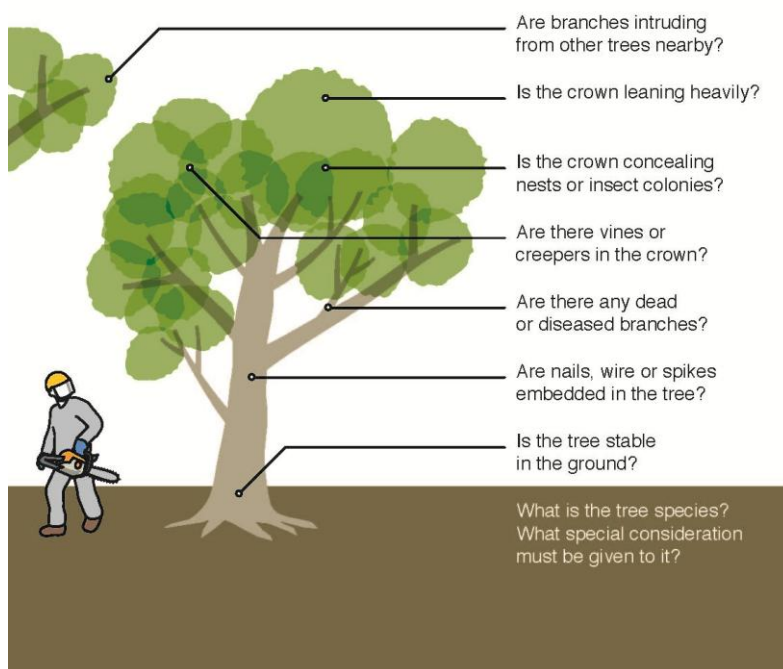


Figure 1: Tree hazards

Tree issues to consider include:

- What particular characteristics of this species should be taken into account?
- Is the species, or this particular tree, susceptible to branch failure when under load?
- Is the tree dead or alive?
- Is it stable in the ground?
- Is the crown leaning heavily in one direction?
- Are there loose or 'hung up' branches or vines/creepers, fungus, fruiting growths, nests or insect colonies present in the crown?
- Is there any evidence of decay at the base of the tree, in the trunk, or in the branch forks?
- Are there any objects (nails, spikes, wire etc) embedded in the trunk or branches?
- Are there other trees adjacent that may intrude into the crown?
- Are there any insects or animals in the tree?
- Is the tree suitable to be climbed?
- Is the tree considered high value? For example, does it have heritage value?

Site

All aspects of the surrounding environment should be assessed - not just the tree. Work should not commence until all reasonably foreseeable hazards have been identified, associated risks have been assessed and relevant control measures implemented.

Site issues to consider include:

- Are there any overhead power lines to take into account?
- What routes are available to enter and exit the site?
- Are there any underground services present (water, gas, phone, electricity or data) that may have been affected by root systems?
- Are there any exposed roots that present a trip hazard to workers?
- What obstacles, structures and other trees are present at the site?
- Is the ground level, uneven, slopping, firm or loose?
- Is there public access to the site?
- What are the climatic conditions?

2.2 Assessing the risks

When an assessment of the tree and site has been completed, assess the risks associated with the proposed activity. A risk assessment involves considering what could happen if someone is exposed to a hazard and the likelihood of it happening. Think about the job as a whole and consider the following:

- What are the options for cutting the tree?
- Can the work be conducted from the ground?
- Can the work be conducted from an elevated work platform?
- Exactly how will the tree be cut and in what order will things happen – take branches off on the way up, or down etc?
- Do we have suitable and sufficient equipment to proceed with the job?
- Is the equipment in good working order?
- Will the job require the use of ropes to assist directing the tree to the ground?
- Where will the tree be falling to and how do we avoid damage to surrounding structures or vegetation?
- How do we keep the public or home owner away from the 'danger zone'?
- Do we have sufficient crew to do the job without cutting corners?
- How will we communicate with each other during the cutting operations?
- Is the work being conducted consistent with AS 4373 - Pruning of amenity trees?
- Have the workers received training, information and instruction relevant to the work being undertaken?
- Are there other businesses or undertakings involved in the activity and how will we consult, co-operate and co-ordinate with them to ensure the work is carried out safely?

2.3 Controlling the risks

Controlling risk involves eliminating the risks, or if that is not reasonably practicable, minimising them so far as is reasonably practicable.

When choosing the most appropriate way to control the risks, the safest method of operation for any tree work must be considered, for example, at each site, consideration should be given as to whether the work can be conducted from ground level. If it is necessary to access the tree above ground level then consideration should be given to the method that will minimise the risks to health and safety.

Good planning, selection of appropriate equipment, well trained operators and sound work methods should minimise the risk of an incident occurring.

The WHS Regulations require that a person with management or control of plant at a workplace must ensure that where plant is used to lift or suspend a person the plant must be specifically designed for that purpose. However, if it is not reasonably practicable to use plant specifically

designed to lift or suspend a person, the person with management or control of the plant may suspend a person in a harness from a crane for tree lopping if prescribed conditions are met.

Chapter 3 provides guidance on methods for accessing a tree.

3. METHODS OF ACCESSING A TREE

Methods of accessing a tree can include climbing the tree, using a temporary work platform, or using an industrial rope access system. Selection of the most appropriate method will depend on various factors including the type of tree, its integrity and the site environment.

The assessment of the tree, site, and associated risks should be used to determine the method of accessing the tree that will minimise the risk to workers and other person's health and safety. Two or more different methods of accessing the tree should not be used at the same time unless the risks of doing so are not more than those present when one method only is used.

Each method of accessing the tree will require the workers to have training or qualifications relevant to the method of access, for example the relevant AQF Horticulture (Arboriculture) qualification.

3.1 Climbing a tree

Every tree must be inspected before work begins to determine whether it can be climbed safely.

If it is decided that climbing is the most appropriate method for the works required, ensure the climber is appropriately skilled, fit and competent and the procedures followed by people on the ground account for all aspects of safety including the potential need to conduct a tree rescue.

Climbers should never work alone.

Generally there should only be one climber in a tree at any one time. However, if two climbers are required, one should be senior and well experienced. There should be good communication between the climbers at all times so that each is aware of the other's position while work progresses.

They should work at about the same height in the tree and remain in sight of each other. Climbers should never work directly above each other.

Climbers must also be able to recognise potential weakness caused by decay, damage or poor structure of the tree. Climbers not specifically trained in utility work (working near power lines) should not be allowed to engage in work within exclusion zones adjacent to overhead power lines. Information regarding applicable exclusion zones should be sought from the relevant utility entity.

When undertaking climbing work the worker should:

- Only use fall arrest rated equipment compliant with *AS/NZS 1891.4 Industrial fall-arrest systems and devices—Selection, use and maintenance*
- Check entire length of climbing ropes, lanyards, harness and karabiners for cuts, excessive wear and correct function prior to each climb.
- Where PPE has been identified by a risk assessment as being required to contribute to the minimisation of risk, then the worker should wear PPE in accordance with manufacturers' specifications and the identified control measures.
- Remove any clothing or other items that may increase the risk of entanglement such as jewellery and tie up long hair before climbing.
- Ensure a second experienced climber is available on site and is trained in first aid and tree rescue.
- Ensure that a second set of climbing gear has been checked and is available for rescue purposes.
- Stay attached to the tree at all times from a high, secure tie-in point with a secondary anchor point.
- When changing anchor points, climbers should transfer their weight to the new system before releasing the original anchor.
- Test any limbs prior to weight bearing.
- Ensure anchor points, equipment and people are clear of drop zones for debris.

- Keep the climbing system as taut as possible and re-route the rope as required to keep it clear of obstructions that could interfere with the safe operation of the system.
- Move through the tree and back to the ground with smooth, controlled movement.
- Secure and make safe all tools and equipment the worker is using.

When undertaking climbing work it is essential that communication be maintained:

- Climbers and ground crew should stay in constant communication via both sight and sound.
- Ground crew must maintain an exclusion zone throughout the works.
- Climbers and ground crew must monitor any exclusion zones.
- All work should stop if other people (or animals) enter the work area.

3.2 Temporary work platform

Temporary work platforms are designed for use as a working platform that prevent the worker from a falling while working in accordance with the manufactures guidance.

Temporary work platforms are not suitable for activities that require the worker to lean outside the structure of the platform and should not be used for the purpose of providing access into a tree unless the conditions set out in *AS 2550.10 Cranes, hoists and winches - Safe use - Mobile elevating work platforms* are met.

Harnesses used by workers on a temporary work platform should be full body fall arrest type harness designed to arrest the fall of the worker if they fall out of the platform.

Issues to consider prior to using a temporary work platform include:

- Access to the site.
- Location of any overhead power lines.
- Ground stability and level.
- The type of tree.
- The size of the branches to be felled.
- The height of the tree.

Elevating work platforms

Boom Type Elevating Work Platforms (EWPs) include cherry pickers, boom lifts and travel towers. There are battery powered and internal combustion engine types. Some are designed for hard flat surfaces only, while others are designed to be operated on rough terrain.

A scissor lift type EWP has a greater risk of being struck and knocked over by falling timber than a boom type EWP. Scissor lift type EWPs should not be used unless the risk of falling timber striking the unit can be eliminated.

The safety considerations include that:

- workers operating the platform are trained and instructed in safe operating procedures for the particular brand and type of equipment, as well as the safe use of fall arrest equipment and emergency rescue procedures
- unless designed for rough terrain, the platforms are used only on a solid level surface
- the surface area is checked to make sure that there are no penetrations, soft ground or obstructions which could cause uncontrolled movement or overturning of the platform
- when designed for rough terrain, the manufacturer's or supplier's instructions are consulted for information on safe operation
- there is another person supervising the work, enforcing any exclusion zone, and available to provide an emergency rescue
- persons working in travel towers, boom lifts or cherry pickers wear a properly anchored fall arrest harness, and
- workers are licensed when operating elevating work platforms with a boom length of 11 metres or more.

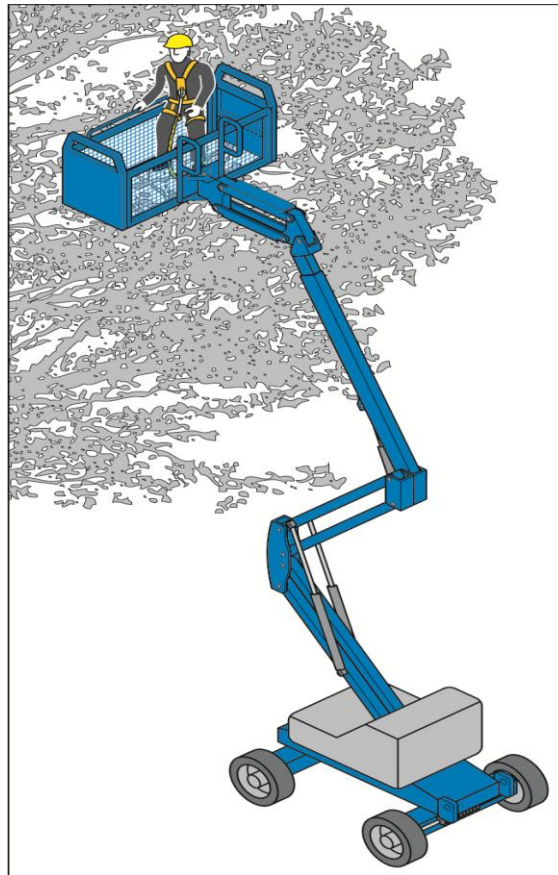


Figure 2: An example of a boom-type elevating work platform.

Suspended Work boxes

A work box is designed to be supported by a crane to provide an elevated work area for persons working from the box.

Where reasonably practicable, other working platforms, such as an elevating working platform, should be used as an alternative to the work box. Before workboxes are selected as a means of access, a risk assessment should be undertaken and recorded demonstrating that the use of other means of access, such as elevating work platforms, are impractical.

Crane-lifted workboxes should meet the following criteria:

- Correctly tagged lifting slings are to be supplied with the workbox and attached to the lifting points by means of hammerlocks or moused shackles.
- The factor of safety for each suspension sling must be at least eight for chains and 10 for wire rope.
- The SWL, tare mass and design registration number of the workbox must be marked on the workbox.
- If the workbox is provided with a door, this should be inward opening only, self-closing and provided with a latch to prevent accidental opening.
- The sides of the workbox should be at least one metre high.
- The work box is designed for the task and securely attached to the crane.
- The workbox, lifting attachments should be checked by a competent person before use.
- The work box is fitted with a suitable anchorage capable of withstanding the fall forces specified in AS/NZS 1891.4 *Industrial fall-arrest systems and devices—Selection, use and maintenance*. Workers must be attached to the anchorage by a lanyard and harness unless the workbox is fully enclosed.
- Designed in accordance with AS 1418.17 *Cranes (including hoists and winches) —Design and construction of workboxes*.

The following must occur to ensure the safety of persons in and out of a crane-lifted workbox:

- The work box is not suspended over persons.
- All persons in the workbox must wear full body fall-arrest harnesses at all times. Harnesses must be attached to designated fall-arrest anchorage points in the workbox or to the main sling ring above the workers' heads. Energy absorbers must be provided on the lanyards (see *AS 1891: Industrial fall-arrest systems and devices* for further information).
- Workers remain substantially within the work box while they are being lifted or suspended.
- An effective means of communication between any person in the work box and the operator is provided.
- The operator remains at the controls of the crane at all times.
- At least one person in the workbox must hold a dogger's licence or appropriate riggers license class to ensure correct directions are communicated to and from the crane operator.

When using a crane-lifted workbox the crane must meet the following criteria:

- The crane is to have a minimum SWL of 1000 kg at the maximum radius for the task to be performed.
- The crane is to have a minimum SWL of at least twice the total load of the workbox and its contents, at the maximum radius for the task to be performed.
- The crane is to be fitted with an upper hoist limit (anti-two block) that stops operation of the hoist, luff and telescope functions of the crane, or be designed so that two-blocking cannot damage any part of the crane or lifting gear.
- The crane's levers and foot pedals are to be fitted with a constant pressure system that stops the crane's motions when the operator removes pressure from the controls.
- The crane is stabilized at all times while the work box is used
- The crane has 'drive up' and 'drive-down' controls on both the hoisting and luffing motions and those controls are used. Declutching allowing free fall is to be locked out while a workbox is in use
- The crane is fitted with a safety hook and moused (lashed) accordingly
- If the crane is fitted with a free fall function it is locked out with a keyed lock-out.

For specifications relevant to the crane and the work boxes refer to *AS 2550.1 Cranes, Hoists and Winches—Safe Use—General Requirements*, and *AS 1418.1, 1418.5 and 1418.17*.

3.3 Industrial rope access systems

Industrial rope access systems are used for gaining access to, and working at, a workface, usually by means of vertically suspended ropes. Although fall arrest components are used in the industrial rope access system, the main purpose of the system is to gain access to a work.

Other methods of accessing a work face should be considered (for example EWPs) before rope access systems, as a high level of skill is needed for their safe use.

Where it is necessary for industrial rope access systems to be used ensure that:

- persons using industrial rope access should utilise work methods and have competency qualifications consistent with the Australian Rope Access Association (ARAA) '*Industry Code for the Industrial Rope Access Method*'
- operators are competent in the technique
- operators do not work alone, in case they require assistance in an emergency
- industrial rope access systems are installed only in a location where it is possible to provide prompt assistance or rescue if required
- all equipment is checked regularly by a competent person
- prior to use, all anchorage points are checked by a competent person before attaching the rope access lines
- two points of attachment are used
- each rope has a separate anchorage point
- any person within three metres of an unguarded edge is adequately secured
- all operators wear a full body harness
- supervisors can communicate with workers
- to prevent accidental dropping all tools of a suitable weight are attached to the worker at all times; heavier items are independently suspended.
- where necessary, appropriate personal protective equipment is used, such as helmets,

- gloves, hearing protection, safety pants, goggles and masks, and
- barricades and signposts are placed on all access areas below the working area and anchorage locations to exclude and alert the public and tradespeople.

Industrial rope access systems require a high level of competency on the part of the user and supervisors to ensure safe use. Users, including supervisors, should undertake a competency based course of training relevant to the work to be undertaken.

When using industrial rope access, the industrial rope access system should be anchored to a solid structure. Where an appropriate solid structure is not available or reasonably practicable then the industrial rope access can be anchored to a mobile crane.

Further guidance on industrial rope access systems is available in the AS/NZS 4488 *Industrial rope access systems* series and the Australian Rope Access Association (ARAA) '*Industry Code for the Industrial Rope Access Method*' and the ARAA Code '*Permanent Anchors for Rope Access Use*'.

Crane anchored industrial rope access systems

A person with management or control of the plant may suspend a person in a harness from a crane (a crane anchored industrial rope access system) for tree lopping if the following prescribed conditions are met:

- a risk assessment shows that suspending a person in a harness from a crane for tree lopping does not create a greater risk to health or safety than using plant specifically designed to lift a person or climbing a tree
- the tree lopping is carried out by a competent person using that harness
- a crane is used to put the competent person in the tree to fell it
- the crane has safety mechanisms that would prevent the competent person from inadvertently falling, and
- while attached to the crane, the competent person is in visual, audio or radio communication with the crane operator.

Reference to a **harness** means a work positioning harness that is designed and certified, in accordance with AS/NZS 1891, for the purpose of lifting a person into a tree.¹

All other methods of accessing a tree should be considered before using a crane anchored industrial rope access system, as a high level of skill is needed for their safe use.

Examples of where a crane anchored industrial rope access system may be an appropriate method of accessing the tree includes in circumstances where:

- a worker could become fatigued from climbing, especially in northern or hot and humid environments
- the integrity of the tree makes accessing the tree by other methods dangerous, and
- the physical environment around the tree makes accessing the tree by other methods dangerous.

Where it is necessary to use a crane anchored industrial rope access system, ensure that:

- a written safe work method statement is prepared and reviewed prior to each lift
- a supervisor with a dogging licence is present on the ground and they maintain constant visual contact with the worker accessing the tree
- the worker accessing the tree has a dogging licence and is the primary person directing the work
- an effective means of communication (such as a secured 2 way radio and a backup system such as a whistle) between the worker, the supervisor and the operator is provided at all times
- the crane operator remains at the controls of the crane at all times, and
- in order to facilitate the safe retrieval of the crane hook without snagging, a crane anchored industrial rope access system is only to be used into areas of the tree where a direct vertical drop is readily available.

¹ A suitable test method for harnesses designed for this purpose is under development.

The same requirements and guidance provided in section 3.1 of this Code is applicable for a worker accessing the tree using the crane anchored industrial rope access system.

The features of the crane used for a crane anchored industrial rope access system must be the same as those applicable for crane suspended work boxes.

The industrial rope access system must be anchored to the crane in such a way that it does not interfere with the function of the crane, or any damage-prevention or warning device on the crane, and so that no part of the crane compromises any part of the industrial rope access system.

The worker must be anchored to the tree prior to commencing any cutting work. This must be done in such a way as to ensure there is no risk of injury to the worker following attachment to the tree and prior to disengaging their anchor from the crane.

Prior to the worker disengaging their anchor to the crane, the crane should remain in place until the worker is attached to the tree by two independent anchor points and the worker has provided clear instruction that they have disengaged all attachments to the crane prior to the crane being moved.

If the worker is to be moved by the crane to another location then the worker must be attached to the anchor point prior to un-attaching themselves from the tree.

If the crane is being used for lifting or assisting in the cutting or removal of the tree or branches then:

- the lifting equipment (for example, chains or sling) used must not compromise any part of the industrial rope access system
- the crane must not take up or support any load while the worker is attached
- the crane should not be able to break any branches when a worker is in the tree
- the worker must not undertake any cutting work while they are attached to the crane, and
- follow the requirements provided in 'Use of mobile cranes for tree lopping' section.

An appropriate harness should be worn by the worker as provided in AS/NZS1891.1. .

The ropes used should be rated and maintained to a breaking strength of at least 25KN and be dynamic synthetic rope with a minimum diameter of 11mm.

The karabiners used should be triple action self locking rated and maintained to a breaking strength of at least 25KN.

Crane anchored industrial rope access systems require a high level of competency on the part of all workers to ensure safe use. Workers, including supervisors, should undertake a competency based course of training relevant to the work to be undertaken such as a certificate III in Horticulture (Arboriculture).

Further guidance on correct selection and maintenance of harnesses and ancillary equipment is available in the AS/NZS 1891 *Industrial fall-arrest systems and devices* series.

4. WORKING IN A TREE

When conducting work in a tree there is a risk of a fall occurring. In addition to the guidance provided in Chapter 6, ensure that:

- All staff have received information, instruction, training and are competent in how to carry out the work being undertaken, for example the worker has a relevant AQF Horticulture (Arboriculture) qualification.
- Wherever possible, workers always have at least 2 points of attachment to the tree.
- If tree climbers are used, ensure that relevant specific training and equipment is supplied.
- Wherever possible, workers do not climb above their anchor points
- No free climbing of trees is ever allowed at any time. Workers must always be secured to the tree with appropriate arboricultural access/positioning equipment.
- An exclusion zone exists below the elevated work.
- A rescue process is in place, supported by the necessary equipment, and ensure that workers are trained in the procedure and practice tree rescue regularly. This means that there should be at least one other person on site who is capable of climbing to be able to retrieve an injured climber.
- Appropriate harness should be worn by the worker as provided in *AS/NZS1891.1*. Workers working in a tree should use a harness designed to restrain or prevent a fall.
- Harnesses are maintained in accordance with manufacturer's instructions and are inspected daily by the operator/user prior to use and are regularly inspected by another qualified person to limit complacency.
- If pole straps or spurs/gaffs are being used that they are designed and correctly adjusted for use in the tree being climbed, and that they are properly maintained.

If chainsaws are being used when a worker is climbing a tree, the following should be considered:

- The worker must have completed a relevant competency based training course in the safe use of chainsaws.
- Ensure the chainsaw has been properly serviced. The chainsaw should be easy to start and the chain should be stationary when the chainsaw is idling
- Stabilise the person's position in the tree before cutting.
- Wherever possible within the two metre fall zone, ensure that there is a second point of attachment.
- Wherever possible, always hold the chainsaw with both hands when in use.
- Wherever possible, operate the chainsaw only below shoulder level.
- Always apply the chain brake when leaving the saw running but not in use.
- The worker must secure and make safe all tools and equipment they are utilising prior to commencing any movement within the tree.

If the work allows for the free falling of cut timber then the method of work must consider and minimise the risks involved with hang-ups of cut timber, and ensure the required exclusion zone of two tree lengths is established and enforced. Ground staff should not enter the exclusion zone until the worker in the tree has stopped the work and advised them it is safe to enter.

If the work requires the controlled lowering of cut timber by means other than a crane, the workers establishing the system must have the relevant training and competency, for example the worker may require a riggers ticket equivalent to the work being performed.

If the work involves the use of a crane, refer to the guidance provided in Chapter 5.

5. USE OF MOBILE CRANES

Use of a mobile crane to position cut sections of the tree from the ground for removal from the site can reduce the risks of musculoskeletal injuries to workers.

Use of a mobile crane where it is connected to the crane hook prior to cutting and the crane is used to assist in lowering the tree parts in a controlled manner may be an appropriate method where parts of the tree are above buildings or other structures or where it is not safe or reasonably practicable to use other methods.

However the use of a mobile crane for this type of work should be considered to be a high risk activity due to the risk of the crane overturning or structural failure of the boom. In addition, it is difficult to eliminate shock loading that will be applied to the crane.

It is essential for the safe use of a mobile crane that the correct mass of the cut timber is assessed and that it is known what direction the cut timber will move. If these issues are not correctly determined it may cause the load radius to increase or apply a side loading to the boom. Safe crane operation requires that only vertical loads be applied to the hoist rope and the loads be applied gradually. This requirement is generally stated in crane manufacturer's instructions.

Mobile cranes must not be used for tree lopping unless the following can be ensured:

- the crane operator remains at the controls of the crane at all times and does not perform the role of a dogger
- a dogger is present during all lifting activities
- a written safe work method statement (SWMS) is prepared and reviewed prior to each lift
- the arborist, crane operator and dogger consult prior to the work commencing so that the work is undertaken in a coordinated way and in accordance with the SWMS
- side loading will not be applied to the crane boom
- any loading to the crane is well within the crane's safe working load
- the crane will not be shock-loaded
- wind will not adversely affect the safe use of the crane
- only vertical loads will be applied to the hoist rope and crane hook
- at completion of the saw cut, the radius of the load will not increase or decrease
- an effective means of communication (such as a secured two-way radio and a backup system such as a whistle) between the worker, the supervisor and the operator is provided at all times

The tree arborist and crane operator are to participate in, and be satisfied with, the documented procedure.

The first lift performed for each tree should be conducted as a conservative test load to test that the work method is appropriate for the job.

Use of a mobile crane in arboricultural or tree cutting work requires a high level of competency on the part of all workers to ensure the health and safety of workers and others.

All workers should have received information, instruction, training relevant to the work to be undertaken. If a worker (including the crane operator) does not have experience in this type of work method they should be directly supervised by a worker who has experience relevant to the work.

Arboriculture workers involved in securing loads to the crane must have a doggers licence and should have undertaken a competency based course of training relevant to the work such as a certificate III in Horticulture (Arboriculture).

6. MANAGING THE RISK OF FALLS

There are a number of ways to control the risks of falls. Some control measures are more effective than others. Control measures can be ranked from the highest level of protection and reliability to the lowest. This ranking is known as the hierarchy of risk control. The highest order control measure that is reasonably practicable must be applied for the activity or a combination of controls that will minimise the risks.

When accessing a tree, the following hierarchy of control measures must be considered:

- carrying out the work on the ground
- using a fall prevention device
- using a work positioning system
- using a fall arrest system, and
- using administrative controls and other reasonably practicable steps.

6.1 Fall prevention device

A fall prevention device is any equipment that is designed to prevent a fall for temporary work at heights, and once in place, does not require any further adjustment by workers using the device.

These include scaffolding, elevating work platforms (EWPs), work boxes, and platforms supported by trestle ladders.

6.2 Work positioning system

A work positioning system involves the use of equipment that enables a person or thing to be safely positioned and supported at a location for the duration of the work being carried out, for example industrial rope access systems.

Work positioning systems require a higher level of operator competency and supervision than control measures which are higher on the hierarchy of control. Accordingly, they must only be used where it is not reasonably practicable to use a passive fall prevention device.

6.3 Fall arrest system

A fall arrest system is equipment that is designed to stop a worker falling an uncontrolled distance.

Individual fall arrest systems rely on workers wearing and using them correctly, and therefore workers who will use such a system must be trained in its safe use. They should only be used where it is not reasonably practicable to use higher level control measures.

A person is required to also wear a fall arrest system with fall prevention devices such as a boom type EWP and work boxes.

Individual fall arrest systems consist of some or all of the following components:

- anchorages
- lifelines
- inertia reel
- lanyard that will not allow a person to fall more than two metres
- retractable lifelines
- rope grabs
- wire grabs
- rail system
- shock absorbers—both personal and industrial
- harness
- snap hooks (double or triple action to prevent rollout)
- karabiners (double or triple action to prevent rollout), and
- rescue equipment.

Anchorage points

All anchorages should be tested and approved by a competent person before use—a visual inspection may not reveal the structural integrity of the anchor point.

Each anchorage point should be located so that a lanyard of the system can be attached to it before the person using the system moves into a position where the person could fall.

Each component of the system and its attachment to an anchorage must be inspected by a competent person:

- after it is installed but before it is used
- at regular intervals, and
- immediately after it has been used to arrest a fall.

Inspection of inertia reels and harnesses should be conducted in accordance with the manufacturer's specifications and the relevant standards.

Limit free fall distance

Fall arrest systems, incorporating a lanyard, should be installed so that the maximum distance a person would free fall before the fall arrest system takes effect is two metres. There should be sufficient distance between the work surface and any surface below to enable the system, including the action of any shock absorber to fully deploy.

To work out whether there is enough distance available, the following should be taken into account:

- the worker's height
- the height and position of the anchorage point
- the length of the lanyard
- any slack in the static line
- Any pendulum motion that may occur during the fall and obstructions that may be hit at any time during the swing
- any stretching of the lanyard or static line when extended by a fall, and
- the length of the energy absorber when extended by a fall.

Lanyards should **not** be used in conjunction with inertia reels as this can result in an excessive amount of free fall prior to the fall being arrested.

Use full body arrest harnesses

A full body fall arrest harnesses should be worn. Waist-type belts should not be used as injuries can result when the wearer's fall is arrested. The harness connection point to the fall arrest line should be made at one of the harness manufacturer's designated fall arrest attachment points.

Maintain minimum of slack in fall arrest line

There should be a minimum of slack in the fall arrest line between the user and the attachment. The anchorage point should be as high as the equipment permits. Never work above the anchor point, as this will increase the free fall distance in the event of a fall, resulting in higher forces on the body and greater likelihood of the arrest line snagging on obstructions

Ensure the fall arrest line cannot fail over an edge

Fall arrest lines can catastrophically fail when they come in contact with an edge during a fall because the fall arrest loads are transferred to the line where it makes contact with the edge. In this situation the energy absorber may not get an opportunity to operate and instead the fall arrest line is cut. The edge over which the fall arrest line can fail does not have to appear to be "sharp". Systems need to be implemented to ensure this type of failure cannot occur – covering the edge prior to testing of the system over an edge is one way to help demonstrate the adequacy of the rope layout.

Use inertia reels correctly

When considering the use of inertia reels, bear in mind that they might not be effective in certain situations. For example, if a worker falls down the inclined surface of a steeply pitched roof, the inertia reel line may keep extending from the reel and it may not lock.

Inertia reels should not be used as working supports by locking the system and allowing it to support the user during normal work. They are not designed for continuous support.

Vertical and self-retracting anchorage safety lines can be used as a risk control measure in connection with work performed from boatswains' chairs and ladders. Where such lines are used, only one person may be attached to any one line. The safety line should be independent of the boatswain's chair support rope.

Use compatible components

Fall arrest systems and safety harnesses should only be used with the individual manufacturer's components known to be compatible. The use of non-compatible components may lead to 'roll-out' with some hook/karabiner configurations, resulting in injury or death to the user. The hazard cannot always be avoided by using components produced by the same manufacturer under the one brand name. If it is unknown whether components of a fall arrest system are compatible, contact the manufacturer for further information.

Snap hooks should be of the double action type, requiring at least two consecutive deliberate actions to open. Snap hooks should not be connected to each other as this could prevent the safe operation of the snap hook (for example, roll-out may occur). Some double action hooks are susceptible to roll-out. Screw gate karabiners or hex nut connectors may sometimes be appropriate. Further guidance is provided in AS/NZS 1891 *Industrial fall-arrest systems and devices*.

Ensure prompt rescue in event of fall

The rescue of a worker who is suspended in a full body harness must occur promptly to prevent suspension trauma (see Chapter 7 of this Code).

Hazards with individual fall arrest systems

If a person using an individual fall arrest system falls, the system may act as a pendulum, and in some situations the user may hit the ground or swing back onto the building or structure.

Swing down can occur if the fall arrest line slides back along the perimeter edge of the roof until it is vertical. When this happens, the person may hit the ground, or the arrest line may break as a result of its contact with the edge of the roof. Measures to address 'swing down' include:

- the installation of guardrails
- placing the anchorage point at a right angle to the position of the line at the perimeter edge (for example, by using a mobile anchorage), and
- the installation of a second anchorage point and belay devices (intermediate anchorages).

6.4 Administrative controls

If it is not reasonably practicable to use any of the above control measures, administrative controls may be considered such as 'no go' areas, procedures for working safely at height and using signs to warn people of a fall hazard.

The use of administrative controls are the least effective control measures because they rely on people's behaviour to reduce the risk of a fall occurring and require a high level of supervision.

In most circumstances it will be appropriate to use an administrative control (such as 'no go' areas) in combination with any of the above or other suitable control measures to minimise risk.

Further guidance on managing the risks of falls is available in the *Code of practice: How to Prevent Falls at Workplaces*.

7. EMERGENCY AND RESCUE PROCEDURES

There are many incidents and situations in tree work that could require emergency action. Therefore it is vital that emergency procedures are developed and workers are trained appropriately. All crew members must be familiar with emergency procedures. Rescue and first aid training must form an integral part of an induction program for all workers. Workers must know these procedures from day one.

Everyone involved in tree rescue must have the appropriate training in all the tasks required.

7.1 Emergency procedures

In developing emergency procedures, the different types of emergency and rescue scenarios that might arise should be considered. Information from the risk assessment will help in this task. Emergency procedures will also depend on the type of control measures that are used to address fall hazards, for example, suspension trauma can occur with the use of fall arrest systems.

When establishing emergency procedures, the following should be taken into account:

Relevant considerations	Questions
Location of the work area	Is the work at height being undertaken in a remote or isolated place? How accessible is it in an emergency and how far away is it from appropriate medical facilities? Can the rescue of a person after an arrested fall be provided immediately, without the need to rely on emergency services?
Communications	How can workers working at height communicate in an emergency?
Rescue equipment	What kinds of emergencies may arise? The provision of suitable rescue equipment will depend on the nature of the work and the control measures used, for example, an emergency rapid response kit with man-made fibre rope, according to AS/NZS 4142.3 <i>Fibre ropes—Man-made fibre rope for static life rescue lines</i> . Selected rescue equipment should be kept in close proximity to the work area so that it can be used immediately.
Capabilities of rescuers	Are rescuers properly trained, sufficiently fit to carry out their task and capable of using any equipment provided for rescue (e.g. breathing apparatus, lifelines and fire-fighting equipment)? Have emergency procedures been tested to demonstrate that they are effective?
First aid	Is appropriate first aid available for injuries associated with falls? Are trained first aiders available to make proper use of any necessary first aid equipment?
Local emergency services—if they are to be relied on for rescue	How will the local emergency services (e.g. ambulance) be notified of an incident?

Workers must have access to first aid equipment and facilities for the administration of first aid. Workers must also be trained to administer first aid or have access to persons who are trained in first aid. Facilities for the provision of first aid are addressed in the [draft] *Code of Practice: First Aid in the Workplace*.

The emergency procedures for falls should be incorporated into the emergency plan required for the workplace under the WHS Regulations.

7.2 Suspension trauma

Suspension trauma can occur with a fall arrest system when a person has an arrested fall and is suspended in an upright, vertical position with the harness straps causing pressure on the leg veins. The lower legs' capacity to store large amounts of blood reduces the return of blood to the heart, slowing the heart rate which can cause the person to faint. This may lead to renal failure and eventually death, depending on a person's susceptibility. This condition may be worsened by heat and dehydration.

Susceptibility to suspension trauma may be unrelated to fitness level or any other obvious physical conditions. Therefore, the quick rescue of a person suspended in a full body harness, as soon as is possible, is vital. For this reason, workers should be capable of conducting a rescue of a fallen worker and be familiar with onsite rescue equipment and procedures.

Workers and emergency response workers must be trained in the rescue procedures and be able to recognise the risks of suspension trauma and act quickly in the rescue of a person.

The training for rescuing workers who have fallen and are suspended in an upright position should address the following factors to prevent suspension trauma:

- the rescue process starts immediately because being suspended in an upright position for longer than five minutes has the potential to cause death, and
- the victim should be moved from suspension in stages, i.e. the procedure should take 30-40 minutes with the victim moved first into a kneeling position, then into a sitting position, and finally into a horizontal position. The victim should not be moved too quickly into a horizontal position because this can kill them.

To prevent suspension trauma occurring as a result of an arrested fall ensure that:

- workers never work alone when using a harness as fall protection
- workers use a sit type harness with padded leg straps, which allows legs to be kept horizontal
- the time a worker spends in suspension after a fall is limited to less than five minutes. When a suspension is longer than five minutes, foothold straps or a way of placing weight on the legs should be provided.
- workers are trained to do the following when they are hanging in their harness after a fall:
 - move their legs in the harness and push against any footholds, where these movements are possible. In some instances, the harness design and/or any injuries received may prevent this movement, and
 - move their legs as high as possible and the head as horizontal as possible, where these movements are possible. These movements are not possible in some of the harnesses available. This factor should be considered when selecting a harness for use at the workplace, and
- harnesses are selected for specific applications, with consideration given to comfort, potential injuries and suspension trauma.

7.3 Insects, animals and plant allergies

Workers may be exposed to insects, spiders, wasps, bees, possums, birds, rats, cats etc whilst working in and around trees. A single wasp or bee sting could be fatal in the event of an allergic reaction, and some workers may be particularly vulnerable to this. Likewise, contact with some plants can cause allergic reactions. Any workers' sensitivities and allergies should be considered in the emergency planning process.

Climbers may disturb insect colonies and may not be in a position to take immediate evasive action if attacked. These risks can be reduced by a thorough inspection of the tree prior to commencement of work, and if potential risks (for example, insect colonies, possum infestation etc) are present, then do not proceed with the work until the problem has been addressed.

Emergency procedures and first aid arrangements should cater for animal and insect bites and stings.

7.4 Aerial Rescue

- A minimum of two people must be present during all tree-climbing operations. One of the ground team should be available, competent and equipped to perform a tree rescue without delay.
- Ensure a designated and responsible person knows the daily work program and agree with them a suitable contact procedure. Where reasonably practicable use a two-way radio or mobile phone and a pre-arranged call-in system. This is particularly important for remote sites where a check on the operator's safety is important.
- When an injured climber needs rescuing, ensure all possible precautions are taken to safeguard other members of the work team and any others entering or approaching the worksite. If overhead cables are involved, do not approach the work area. Stop work, assess the situation and contact the relevant electrical authority.
- Ensure no unauthorised people are within the working area.
- The casualty's condition must be assessed. If necessary, call for the emergency services before starting the rescue, ensuring appropriate information is given regarding the location of the site and any particular access problems. Personal details about the casualty (names and any relevant medical history etc) as well as the approximate time of the accident, treatment given and any chemicals involved should also be provided.

8. COMMON HAZARDS FOR TREE TRIMMING AND ARBORICULTURAL WORK

8.1 Electrical safety

Electric lines pose significant risks for a range of activities such as tree trimming and driving machinery with elevated loads.

In arboriculture and tree trimming work, risks associated with working near electric lines include:

- the nature of the work to be undertaken, including safe traffic paths for mobile plant entering or leaving the site and any workers in contact with the mobile plant
- the level of electrical safety awareness of persons around electrical parts such as electric lines
- location, construction (insulated / non-insulated) and voltage of the electric lines, and their proximity to the work and any mobile plant
- the type of mobile plant and machinery used, including the height and operating reach of the plant in both operating and transport configurations
- the potential for inadvertent movement of the mobile plant or loads
- the potential for weather conditions to influence proximity to electric lines - powerlines can sway in strong winds, sag as the temperature increases, and are difficult to see at dawn and dusk, and
- the use of hand tools near or within the safe working distance or exclusion zone.

These risks can be addressed to a significant extent by observing safe working distances for activities that may be conducted near electric lines. These safe working distances will depend on the type of operation or work being performed, and the voltage of the electric lines. Key means of addressing risks associated with working near electric lines include:

- consult the relevant electricity supply authority or owner of the electric lines to determine the safe working distance or exclusion zones required for the operations and consider the disconnection of supply
- incorporate these safe working distances or exclusion zones into the relevant activities identified when planning for arboriculture and tree trimming
- workers, including contractors, should be informed of and understand these requirements, and
- monitor the sag and sway of the electric lines, which can vary greatly depending on the temperature, span length and wind velocity.

In addition to the above, other means of addressing risks associated with working near electric lines include:

- qualifications, competency and supervision of persons undertaking the work
- ensuring a safety spotter (observer) is used whenever mobile plant is in motion and is likely to come closer than the safe operating approach distance (note that an exclusion zone must not be compromised)
- providing ground barriers or signs, where appropriate, to warn of the presence of power lines
- ensuring an effective communication system is in place for the workers performing the work, and
- ensuring a process is in place to monitor compliance with these procedures.

Additionally, when using plant such as stump grinders or excavators to dig up tree roots contacting '**DIAL BEFORE YOU DIG**' on 1100 can assist with identifying the location and depth of underground services such as power, telecommunications and sewerage.

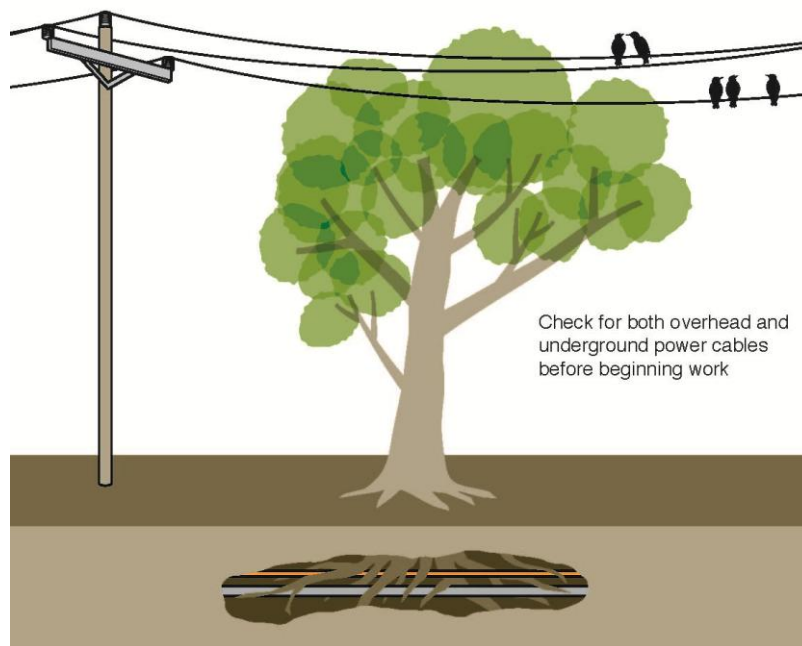


Figure 3: Hazards associated with overhead and underground essential services

8.2 Plant

Plant and equipment used in the industry can be very dangerous, particularly wood chippers, stump grinders, root pruners and chainsaws. Injury could occur from:

- Entrapment – getting caught in moving parts of machinery
- Electrical – contacting overhead or underground power lines
- Cuts – from sharp equipment, branches etc.
- Flying debris – eye injuries from debris such as flying wood chips, branches etc.
- Falling from a height, or having something fall on a person from a height

Chippers

All staff who operate the equipment must have received adequate training in how to operate the equipment and the relevant safety features involved.

Before using a wood chipper the operator should check it has been properly maintained, and the safety features are operational and in good condition. In particular, the duty holder must ensure that guards are securely in place, that blades are sharp and secure, and that all bolts and nuts are torqued to the manufacturers' specifications. Particular attention must be paid to the knife and anvil bolts.

The operator should wear appropriate PPE such as head, eye and hearing protection. Loose clothing that could be drawn into the machine should not be worn.

The feed chute or feed table must have sufficient height on its side members to prevent the operator coming into contact with the blades or knives during operation. The outer edge of the chute should be at least 1450mm from any moving part in which the operator could be entangled.

Where a truck is used to 'catch' wood chips it is enclosed (i.e., 3 full sides and a roof) to prevent chips flying around the area (and possibly into passing cars, pedestrians and injuring people). Also ensure suitable methods are used to protect the public, including appropriate signage and where necessary, suitable barriers to keep public out of the area.

Chainsaws

Before using chainsaws ensure:

- all equipment must be adequately maintained as per the manufacturer's requirements: including assessing sprocket side covers and body for cracks and damage
- safety features are operational and in good condition – including chain catcher cover fitted, chain brake, inertial chain brake where fitted, spiked bumpers and dog teeth, guide bar cover, handles fixed securely to saw, throttle triggers/levers and stop/start controls
- all staff who operate the equipment have received training and are competent in how to operate the equipment and the relevant safety features involved
- workers should also be trained in tree lopping and trimming techniques
- exclusion zones are in operation at ground level to prevent others coming into contact with falling tree branches etc.
- adequate personal protective equipment is available and used by workers including at least chainsaw chaps or chainsaw pants, eye protection, hearing protection and a helmet, etc. (Be aware of the potential for chainsaw pants and chaps to fail if the protective panels are pulled taut between the knee and waist).

The operator should wear appropriate PPE such as head, eye and hearing protection. Loose clothing that could be drawn into the machine should not be worn.

Stump grinders

Before using stump grinders or root pruners ensure:

- the safety features are operational and in good working order – including guards fitted to cutting discs, skirts on sides and rear to prevent flying debris, screens in front of stump grinder whilst in operation to also prevent flying debris, drive belts guarded, etc.
- the operation will not contact or disturb any essential services;
- the area surrounding the stump or root is free from loose stones, concrete or other debris;
- all staff who operate the equipment have received training and are competent in how to operate the equipment and the relevant safety features involved;
- an exclusion zone is in place whilst operating the stump grinder to prevent people coming in front of the cutting disc;
- the operator does not leave the controls while the cutting wheel is moving;
- that the cutting wheel is not moving when moving the equipment.

The operator should wear appropriate PPE such as head, eye and hearing protection. Loose clothing that could be drawn into the machine should not be worn.

8.3 Traffic and public protection

Managing traffic at a work site includes more than vehicles. Pedestrian traffic is often at higher risk of injury around tree works than vehicles. Exclusion zones should be established and maintained around a work site to keep members of the public (and/or other workers) at a safe distance.

Working in the vicinity of children also presents traffic management problems that should be considered, such as scheduling work near playgrounds or schools when they are unattended.

It is not enough to erect signs and assume they will be observed by others. The following should also occur:

- Traffic is kept clear of equipment and/or any potential for flying debris (i.e., wood chips, branches etc) – this can be done by having total or partial road closures which are approved by local council or other local regulatory authority, using barricading to prevent access to equipment, re-routing traffic flow, conducting the work at times of the day when traffic flow is least, etc

- All vegetation trimmed from trees is removed from areas where the public can access, either by transporting it to local refuse tips or chipping on site and removal of chips
- Exclusion zones are established at ground level around operating equipment and when there is any likelihood of items falling to the ground to prevent people accessing the high risk area
- If footpath area is closed, ensure that pedestrians have an alternate route, and that appropriate road/footpath closure permits have been obtained from local authorities. Pedestrian/vehicular interfaces should be considered and appropriate controls put in place to prevent pedestrians being endangered by vehicles, including those involved in the tree work.
- Additional ground crews may be required to liaise between the tree cutting crew and the traffic controllers, or simply to ensure that the public is kept well clear, and also to assist in speedy removal of debris from roadways, thus minimising traffic congestion.
- Train and appoint staff to observe and keep all traffic clear of the exclusion zones.
- If any tree operation requires a change of traffic direction or vehicle speed limits, full traffic control is required. This can only be performed by a trained person. Training courses are available for traffic controllers and work site traffic management.
- If 'Stop' or 'Slow' signs are required, traffic controllers should be trained in traffic management and must be able to communicate with one another without difficulty. Two-way radios are necessary if workers cannot see each other.
- Barriers should be erected to direct vehicle and pedestrian traffic around exclusion zones.
- Trained crew members must monitor traffic, signs and barriers and ensure that they are functioning appropriately - and revise them as work at the site progresses or changes.
- All ground crew should remain watchful for entry into the exclusion zone as signs alone will not remove the potential for breaches.
- Workers wear suitable high visibility clothing at all times, including when working near traffic areas.

APPENDIX A – CHECKLISTS

The following checklists may be used to cover typical operations, staff and equipment and will help ensure all safety and operational aspects of the job have been considered. They can be amended to suit specific activities.

Checklist - Prior to leaving the yard

- Does the job only require ground work?
- Does the job require climbing?
- Have climbers and crew been trained in emergency procedures?
- Does the job require an elevating work platform (EWP) or can an EWP be used instead of climbing?
- Does the job require specialist rigging gear?
- Have operators and crew been trained in emergency procedures?
- Do relevant authorities (e.g. power company, local government) need to be notified?
- Are relevant permits, certification and licences held and accounted for?
- Is the correct equipment and staff allocated to the job?
- Is all equipment in good working order and all checked prior to departure?
- Has the equipment and tools such as chainsaws been maintained to ensure it is safe for use?
- Are all staff fit for work?
- Are all staff trained and capable for the tasks allocated to them?

Checklist - At the site, prior to commencing work

- All Hazards have been identified and assessed on-site.
- Weather conditions and the wind speed have been checked. Wind velocity is not above 10 km/hr
- Action plans have been discussed with all crew members in relation to hazards.
- Trees have been inspected for conditions or situations that could pose a risk.
- The path of the tree's fall, debris fall and all impact points have been assessed.
- Potential for damage to buildings, equipment and vehicles have been assessed and managed.
- Potential weather issues have been considered (wind, heat, cold, and rain) and discussed with crew.
- Equipment has been placed to minimise risk to crew and the public.
- Appropriate signage, manned or taped off areas (exclusion zones) are in place.
- Final gear check performed to ensure good working order.
- Emergency procedures have been evaluated in relation to the site and crew are trained.
- Communication to base and emergency services is available with adequate signal.

Work should not commence until all potential hazards and risks have been assessed and control measures have been implemented.

APPENDIX B – OTHER SOURCES OF INFORMATION

Australian Standards and Australian/New Zealand Standards

- AS 1418.1 Cranes (including hoists and winches) – General requirements
- AS 1418.5 Cranes (including hoists and winches_ Mobile Cranes
- AS 1418.17 *Cranes (including hoists and winches) —Design and construction of workboxes*
- AS/NZS 1576 *Scaffolding series*
- AS/NZS 1657 *Fixed platforms, walkways, stairways and ladders—Design, construction and installation*
- AS/NZS 1891.1 *Industrial fall-arrest systems and devices—Harnesses and ancillary equipment*
- AS/NZS 1891.2 supp:1-2001 *Industrial fall-arrest systems and devices—Horizontal lifeline and rail systems—Prescribed configurations for horizontal lifelines (Supplement to AS/NZS 1891.2:2001)*
- AS/NZS 1891.3 *Industrial fall-arrest systems and devices—Fall-arrest devices*
- AS/NZS 1891.4 *Industrial fall-arrest systems and devices—Selection, use and maintenance*
- AS/NZS 1892 *Portable ladders series*
- AS/NZS 2153 *Series, Tractors and machinery for agriculture and forestry*
- AS 2550 Cranes, hoists and winches – safe use series
- AS 2726 *Chainsaws – Safety Requirements*
- AS 2727 *Chainsaws – Guide to safe working practices*
- AS 3575 *Clearing saws, brush cutters and grass trimmers – Safety requirements*
- AS 3576 *Clearing saws, brush cutters and grass trimmers- Guide to safe work practices*
- AS 4024.2601-2008 *Series, Safety of Machinery*
- AS/NZS 4142.3 *Fibre ropes—Man-made fibre rope for static life rescue lines*
- AS 4373 *Pruning of amenity trees*
- AS/NZS 4453 *Leg protection for users of hand held chainsaws*
- AS/NZS 4488 *Industrial rope access systems series*
- AS/NZS 4488.2 *Industrial rope access systems—Selection, use and maintenance*
- AS/NZS 4576 *Guidelines for scaffolding*
- AS/NZS 4994 *Temporary edge protection series*

Industry Standards

- The Australian Rope Access Association (ARAA) '*Industry Code for the Industrial Rope Access Method*'